

**What is claimed is:**

1           1. Apparatus for use in a video image de-interlacer comprising:  
2           a frame interpolator for yielding a frame based luminance value for a missing  
3 pixel by using frame based interpolation;  
4           a field interpolator for yielding a field based luminance value for a missing pixel  
5 by using field based interpolation;  
6           a luminance difference unit for obtaining luminance value differences of pixels in  
7 prescribed fields of an image in accordance with prescribed criteria;  
8           a motion detector supplied with prescribed ones of said luminance value  
9 differences for generating a motion metric value at a missing pixel;  
10          a spatial median filter supplied with at least three of said motion metric values for  
11 determining a median motion metric value; and  
12          a controllable combiner supplied with said frame based luminance value and said  
13 field based luminance value and being responsive to a representation of said median  
14 motion metric value to controllably supply as an output a luminance value for said  
15 missing pixel.

1           2. The apparatus as defined in claim 1 wherein said spatial median filter is a nine-  
2 value spatial median filter.

1           3. The apparatus as defined in claim 1 wherein said combiner, in response to said  
2 representation of said median motion metric value indicating the image is still, outputs  
3 said frame based luminance value, and said combiner, in response to said representation  
4 of said median motion metric value indicating motion in the image, outputs said field  
5 based luminance value.

1           4. The apparatus as defined in claim 3 wherein said frame based luminance value  
2 is generated by said frame interpolator in accordance with  $C_0 = C_{-1}$ , where  $C_0$  is the  
3 luminance value of the missing pixel in field  $f_0$  and  $C_{-1}$  is the luminance value of a pixel  
4 corresponding to the missing pixel in a last prior field  $f_{-1}$  relative to field  $f_0$ , and said  
5 field based luminance value is generated by said field interpolator in accordance with

6  $C_0 = \frac{(N_0 + S_0)}{2}$ , where  $N_0$  is the luminance value of a pixel above of and in the same

field  $f_0$  as the missing pixel, and  $S_0$  is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel .

5. The apparatus as defined in claim 1 wherein said luminance difference unit generates a plurality of prescribed luminance value differences of pixels in prescribed fields of the image, and said motion detector employs prescribed relationships of said luminance value differences to generate said motion metric value.

6. The apparatus as defined in claim 5 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , and generates at least a second luminance difference value in accordance with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

7. The apparatus as defined in claim 6 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_a)$ , where  $\Delta$  is said motion metric value.

8. The apparatus as defined in claim 5 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , generates a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ , where  $N_0$  is a luminance value of a

pixel above of and in the same field  $f_0$  as the missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and generates at least a third luminance difference value in accordance with  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

9. The apparatus as defined in claim 8 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.

10. The apparatus as defined in claim 1 further including a look-up table including blending factor values related to said median motion metric values and being responsive to said median motion metric value from said spatial median filter for supplying as an output a corresponding blending factor value as said representation of said median motion metric value.

11. The apparatus as defined in claim 10 wherein said controllable combiner is responsive to said blending factor for supplying as an output a luminance value for said missing pixel in accordance with  $C_0 = \alpha \frac{(N_0 + S_0)}{2} + (1 - \alpha)C_{-1}$ , where  $C_0$  is the luminance value of the missing pixel in field  $f_0$ ,  $C_{-1}$  is the luminance value of a pixel corresponding to the missing pixel in a last prior field  $f_{-1}$  relative to field  $f_0$ ,  $N_0$  is the luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $\alpha$  is the blending factor.

12. The apparatus as defined in claim 11 wherein said luminance difference unit generates a plurality of prescribed luminance value differences of pixels in prescribed fields of the image, and said motion detector employs prescribed relationships of said luminance value differences to generate said motion metric value.

13. The apparatus as defined in claim 12 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , and generates at least a second luminance difference value in accordance with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

14. The apparatus as defined in claim 13 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_a)$ , where  $\Delta$  is said motion metric value.

15. The apparatus as defined in claim 10 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , generates a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and generates at least a third luminance difference value in accordance with  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below

of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel .

16. The apparatus as defined in claim 15 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.

17. Apparatus for use in a video image de-interlacer comprising:  
a frame interpolator for yielding a frame based luminance value for a missing pixel by using frame based interpolation;

a field interpolator for yielding a field based luminance value for a missing pixel by using field based interpolation;

a luminance difference unit for obtaining luminance value differences of pixels in prescribed fields of an image in accordance with prescribed criteria;

a motion detector supplied with prescribed ones of said luminance value differences for generating a motion metric value at a missing pixel;

a look-up table including blending factor values related to said motion metric values and being responsive to supplied motion metric values for supplying as an output corresponding blending factor values;

a spatial median filter supplied with at least three of said blending factor values for determining a median motion metric value; and

a controllable combiner supplied with said frame based luminance value and said field based luminance value and being responsive to a said median blending factor value to controllably supply as an output a luminance value for said missing pixel.

18. The apparatus as defined in claim 17 wherein said spatial median filter is a nine-value spatial median filter.

19. The apparatus as defined in claim 17 wherein said combiner, in response to said representation of said median motion metric value indicating the image is still, outputs said frame based luminance value, and said combiner, in response to said representation of said median motion metric value indicating motion in the image, outputs said field based luminance value.

20. The apparatus as defined in claim 17 wherein said controllable combiner is responsive to said blending factor for supplying as an output a luminance value for said

missing pixel in accordance with  $C_0 = \alpha \frac{(N_0 + S_0)}{2} + (1 - \alpha)C_{-1}$ , where  $C_0$  is the luminance value of the missing pixel in field  $f_0$ ,  $C_{-1}$  is the luminance value of a pixel corresponding to the missing pixel in a last prior field  $f_{-1}$  relative to field  $f_0$ ,  $N_0$  is the luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $\alpha$  is the blending factor.

21. The apparatus as defined in claim 20 wherein said luminance difference unit generates a plurality of prescribed luminance value differences of pixels in prescribed fields of the image, and said motion detector employs prescribed relationships of said luminance value differences to generate said motion metric value.

22. The apparatus as defined in claim 21 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , and generates at least a second luminance difference value in accordance with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

23. The apparatus as defined in claim 22 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_a)$ , where  $\Delta$  is said motion metric value.

24. The apparatus as defined in claim 21 wherein said luminance difference unit generates a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , generates a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and generates at least a third luminance difference value in accordance with  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel .

25. The apparatus as defined in claim 24 wherein said motion detector generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.

26. A method for use in a video image de-interlacer comprising the steps of:  
frame interpolating to yield a frame based luminance value for a missing pixel by using frame based interpolation;  
field interpolating to yield a field based luminance value for a missing pixel by using field based interpolation;  
obtaining luminance value differences of pixels in prescribed fields of an image in accordance with prescribed criteria;  
in response to prescribed ones of said luminance value differences, generating a motion metric value at a missing pixel;  
spatial median filtering at least three of said motion metric values to determine a median motion metric value; and

12 controllably combining said frame based luminance value and said field based  
13 luminance value and in response to a representation of said median motion metric value  
14 controllably supplying as an output a luminance value for said missing pixel.

1 27. The method as defined in claim 26 wherein said step of spatial median  
2 filtering employs a nine-value spatial median filter.

1 28. The method as defined in claim 26 wherein said step of combining, in  
2 response to said representation of said median motion metric value indicating the image  
3 is still, outputs said frame based luminance value and, in response to said representation  
4 of said median motion metric value indicating motion in the image, outputs said field  
5 based luminance value.

1 29. The method as defined in claim 28 wherein said step of frame interpolating  
2 includes a step of generating said frame based luminance value in accordance with  
3  $C_0 = C_{-1}$ , where  $C_0$  is the luminance value of the missing pixel in field  $f_0$  and  $C_{-1}$  is the  
4 luminance value of a pixel corresponding to the missing pixel in a last prior field  $f_{-1}$   
5 relative to field  $f_0$ , and said step of field interpolating includes a step of generating said  
6 field based luminance value in accordance with  $C_0 = \frac{(N_0 + S_0)}{2}$ , where  $N_0$  is the  
7 luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel, and  $S_0$   
8 is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel.

1 30. The method as defined in claim 26 wherein said step of obtaining luminance  
2 value differences includes a step of generating a plurality of generating a motion metric  
3 value includes a step of employing prescribed relationships of said luminance value  
4 differences to generate said motion metric value.

1 31. The method as defined in claim 30 wherein said step of obtaining luminance  
2 value differences includes a step of generating a first luminance difference value in  
3 accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding  
4 to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing  
5 pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  
6  $f_1$ , and a step of generating at least a second luminance difference value in accordance



7 with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and  
8 in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and  
9 in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of  
10 the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the  
11 missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in  
12 the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

1 32. The method as defined in claim 31 wherein said step of generating a motion  
2 metric value generates said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_a)$ ,  
3 where  $\Delta$  is said motion metric value.

1 33. The method as defined in claim 30 wherein said step of obtaining luminance  
2 value differences includes a step of generating a first luminance value in accordance with  
3  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing  
4 pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is  
5 a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , a step of  
6 generating a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ ,  
7 where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the  
8 missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in  
9 the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and a step  
10 of generating at least a third luminance difference value in accordance with  
11  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  
12  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing  
13 pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

1 34. The method as defined in claim 33 wherein said step of generating a motion  
2 metric value includes a step of generating said motion metric value in accordance with  
3  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.

1 35. The method as defined in claim 26 further including a step of employing a  
2 look-up table including blending factor values related to said median motion metric

values and, in response to a supplied median motion metric value, supplying as an output a corresponding blending factor value as said representation of said median motion metric value.

36. The method as defined in claim 35 wherein said step of controllably combining, in response to said blending factor, supplying as an output a luminance value for said missing pixel in accordance with  $C_0 = \alpha \frac{(N_0 + S_0)}{2} + (1 - \alpha)C_{-1}$ , where  $C_0$  is the luminance value of the missing pixel in field  $f_0$ ,  $C_{-1}$  is the luminance value of a pixel corresponding to the missing pixel in a last prior field  $f_{-1}$  relative to field  $f_0$ ,  $N_0$  is the luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $\alpha$  is the blending factor.

37. The method as defined in claim 36 wherein said step of obtaining luminance value differences includes a step of generating a plurality of prescribed luminance value differences of pixels in prescribed fields of the image, and said step of generating a motion metric value includes a step of employing prescribed relationships of said luminance value differences to generate said motion metric value.

38. The method as defined in claim 37 wherein said step of obtaining luminance values differences includes a step of generating a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , and a step of generating at least a second luminance difference value in accordance with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the

missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

39. The method as defined in claim 38 wherein said step of generating a motion metric value includes a step of generating said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_n)$ , where  $\Delta$  is said motion metric value.

40. The method as defined in claim 35 wherein said step of obtaining luminance value differences includes a step of generating a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , a step of generating a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and a step of generating at least a third luminance difference value in accordance with  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

41. The method as defined in claim 40 wherein said step of generating a motion metric value includes a step of generating said motion metric value in accordance with  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.

42. A method for use in a video image de-interlacer comprising the steps of:  
frame interpolating to yield a frame based luminance value for a missing pixel by using frame based interpolation;  
field interpolating to yield a field based luminance value for a missing pixel by using field based interpolation;  
obtaining luminance value differences of pixels in prescribed fields of an image in accordance with prescribed criteria;

in response to prescribed ones of said luminance value differences, generating a motion metric value at a missing pixel;

in response to supplied motion metric values, utilizing a look-up table including blending factor values related to said motion metric values to supply as an output corresponding blending factor values;

spatial median filtering at least three of said blending factor values for determining a median blending factor value; and

controllably combining said frame based luminance value and said field based luminance value and in response to said median blending factor value controllably supplying as an output a luminance value for said missing pixel.

43. The method as defined in claim 42 wherein said spatial median filter is a nine-value spatial median filter.

44. The method as defined in claim 42 wherein said step of combining includes a step, responsive to said median blending factor value indicating the image is still, of outputting said frame based luminance value, and a step, responsive to said median blending factor value indicating motion in the image, of outputting said field based luminance value.

45. The method as defined in claim 42 wherein said step of combining includes a step, responsive to said median blending factor, of supplying as an output a luminance value for said missing pixel in accordance with  $C_0 = \alpha \frac{(N_0 + S_0)}{2} + (1 - \alpha)C_{-1}$ , where  $C_0$  is the luminance value of the missing pixel in field  $f_0$ ,  $C_{-1}$  is the luminance value of a pixel corresponding to the missing pixel in a last prior field  $f_{-1}$  relative to field  $f_0$ ,  $N_0$  is the luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is the luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel and  $\alpha$  is the blending factor.

46. The method as defined in claim 45 wherein said step of obtaining luminance value differences includes a step of generating a plurality of prescribed luminance value differences of pixels in prescribed fields of the image, and said step of generating a

motion metric value includes a step of employing prescribed relationships of said luminance value differences to generate said motion metric value.

47. The method as defined in claim 46 wherein said step of obtaining luminance value differences includes a step of generating a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , and a step of generating at least a second luminance difference value in accordance with  $\Delta_a = \left| \frac{N_0 + S_0}{2} - \frac{N_{-2} + S_{-2}}{2} \right|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel,  $S_0$  is a luminance value of a pixel below of and in the same field  $f_0$  as the missing pixel,  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing pixel, and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

48. The method as defined in claim 47 wherein said step of generating a motion metric value includes a step of generating said motion metric value in accordance with  $\Delta = \max(\Delta_c, \Delta_a)$ , where  $\Delta$  is said motion metric value.

49. The method as defined in claim 46 wherein said step of obtaining luminance value differences includes a step of generating a first luminance difference value in accordance with  $\Delta_c = |C_1 - C_{-1}|$ , where  $C_{-1}$  is a luminance value of a pixel corresponding to the missing pixel in the last prior field  $f_{-1}$  relative to a field  $f_0$  including the missing pixel and  $C_1$  is a luminance value of a pixel corresponding to the missing pixel in field  $f_1$ , a step of generating a second luminance difference value in accordance with  $\Delta_n = |N_0 - N_{-2}|$ , where  $N_0$  is a luminance value of a pixel above of and in the same field  $f_0$  as the missing pixel and  $N_{-2}$  is a luminance value of a pixel above of the missing pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel, and a step of generating at least a third luminance difference value in accordance with

11  $\Delta_s = |S_0 - S_{-2}|$ , where  $S_0$  is a luminance value of a pixel below of and in the same field  
12  $f_0$  as the missing pixel and  $S_{-2}$  is a luminance value of a pixel below of the missing  
13 pixel and in the second prior field  $f_{-2}$  relative to the field  $f_0$  including the missing pixel.

1 50. The method as defined in claim 49 wherein said step of generating a motion  
2 metric value includes a step of generating said motion metric value in accordance with  
3  $\Delta = \max(\Delta_c, \min(\Delta_n, \Delta_s))$ , where  $\Delta$  is said motion metric value.